Vol 14 No 1 • January–March 2007

SEDIMENTS

Newsletter of the North Carolina Sedimentation Control Commission

Town of Southern Pines and Wake County Win Local Programs Awards

By Kelly Porter
Water Resources Research Institute

THE TOWN OF SOUTHERN PINES and Wake County local programs received this year's awards of excellence in erosion and sedimentation control at the Awards Luncheon on January 31, 2007, at the Hawthorne Inn and Conference Center in Winston-Salem, NC. Mark Taylor, NC Sedimentation Control Commission member, delivered the keynote address. He thanked the local governments for the important role they play in erosion and sedimentation control.

Local Program Awards are given in two categories: (1) programs devoting resources of up to three man-years of support and (2) programs devoting resources of more than three man-years of support.

The Town of Southern Pines received the Local Programs Award of Excellence for a program of fewer than three staff members. This local program is located within the Town of Southern Pines Public Works Department. Travis Morgan, town engineer, oversees the program and works closely with Mary Robinson, engineering technician, and Barry Hinson, construction inspector, to implement all aspects of the program. Being in the heart of golf country, the majority of the plans that they deal with are for golf courses, country clubs and communities.

Byron Brady (second from left), Section head, receives the Local Program Award for Wake County from Grover McPherson (left) and Mark Taylor (right), NC Sedimentation Control Commission members. Also pictured are Debbie Greene and Mike Coughlin, environmental engineers/consultants.

Travis Morgan (second from right), town engineer, receives the Local Program Award for the Town of Southern Pines from Mark Taylor (right) and Grover McPherson, NC Sedimentation Control Commission members. Also pictured are Barry Hinson, construction inspector, and Mary Robinson, engineering technician.

Seeing the need for a local program, Kyle Sonnenberg, NC Sedimentation Control Commission chair and former city manager, laid the foundation for the Town of Southern Pines to start their local program in 1994. At that time, B.B. Teague, former public works director, and A.H. Davis, Jr., former public works construction inspector, implemented the local program.

Located in both the Cape Fear and Lumber River Basins, the Town of Southern Pines enforcement area covers about 16.2 square miles. The local program ordinance requires submission of an erosion control plan for land-disturbing activity of 30,000 square feet or more, and submission of a soil erosion and sedimentation control compliance form for land-disturbing activity under 30,000 square feet.

Every two weeks, the local program staff meets with other sections within the Public Works Department to discuss submitted

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and Natural Resources
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Division of Land Resources
James D. Simons, Director
and State Geologist

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and active plans. This practice provides a good avenue for open communication and teamwork. The local program staff maintains good working relationships with their clients through open communication and regular site visits.

The Town of Southern Pines has demonstrated that the key to their successful program is working together as a team and maintaining good communication with the developers and contractors. More information is available at http://www.southernpines.net/PublicWorks/Engineering.aspx.

Wake County received the Local Programs Award of Excellence for a program of more than three staff members. This local program is located within the Wake County Environmental Services Department. Byron Brady, Section head and environmental engineer/consultant, oversees the program. He works closely with his staff of environmental engineers/consultants that include Mike Coughlin, Debbie Greene, Glenn Johnson, Dave Parnell, Charles Phillips and Daniel Rowe. They also enlist the assistance of ten building inspectors that perform the initial erosion and sedimentation control inspections for all single-family home construction.

Located in both the Neuse River and Cape Fear River Basins, Wake County enforcement area covers the unincorporated areas of the county and the extra territorial jurisdictions of Fuquay Varina, Garner, Knightdale, Morrisville, Rolesville, Wendell, and Zebulon. The local program ordinance requires an erosion control plan submission for land disturbance of more than one acre. For building lots under one acre of land disturbance, the responsible party must follow minimum erosion control measures as stated in the local program ordinance.

Each staff engineer is assigned to one of seven areas in Wake County where they review all the plans and conduct erosion control inspections. They each have laptops that are equipped with air cards to allow access to the office database to complete their erosion control reports. They also have digital cameras, smart tool levels and hand-held GPS units to help them do their jobs more effectively.

The Wake County program has expanded their outreach through distributing an informational flyer about the new regulations in their ordinance, having a "Lunch & Learn" seminar for area homebuilders, publishing an electronic newsletter, and informing the public through other local events. The staff has also found it effective to post stop work orders in both English and Spanish.

Wake County has demonstrated that the key to their successful program is being efficient through the use of technology, educating developers and contractors, and communicating effectively with each other and the individuals conducting land-disturbing activities. More information is available at http://www.wakegov.com/water/erosion/default.htm.

NC Sedimentation Control Commission: February Actions

At its meeting on February 15, 2007, the NC Sedimentation Control Commission (SCC) took the following actions. Supporting documents for these actions may be found online at: http://dlr.enr.state.nc.us/scc.html

- Approved the staff recommendations regarding the NC DOT Annual Review. Staff recommended continued delegation.
- Approved the delegation of a new Caldwell County local program along with initial funding of $33,785.
- Approved the delegation of a new Henderson County local program along with initial funding of $33,785.
- Approved the delegation of a new Lincoln County local program along with the initial funding of $33,785.
- Disapproved a request for funding from the Pitt County local program.
- Approved the staff recommendation to support an increase in the Sedimentation and Erosion Control Plan Review Fee from $50 to $65 per disturbed acre to provide funding for seven additional inspectors.
- Approved Sedimentation Education projects as follows: $6500 for RUSLE training, $40,000 for local program training scholarships, and any unexpended funds will support the Field Manual and Design Manual revisions.

SEDIMENTS is published quarterly by the NC Sedimentation Control Commission to provide information and assistance to the regulated community and to facilitate communication among personnel of state and local erosion and sedimentation control programs.

Send comments to Ashley Rodgers, NCDENR-Land Quality, 1612 Mail Service Center, Raleigh, NC 27699-1612. Email: Ashley.Rodgers@ncmail.net. Send change of address and subscription information to Soil Science Dept., Campus Box 7619, North Carolina State University, Raleigh, NC 27695-7619 (919) 513-1678; joni_tanner@ncsu.edu). Fifty-five hundred copies of this newsletter were printed at a cost of $1,448 or 26 cents per copy.

Personnel of the Land Quality Section of the NC Department of Environment and Natural Resources provide information and assistance for implementation of the NC Erosion and Sedimentation Control Program. For assistance, please contact the Regional Engineer or the Raleigh headquarters listed below:

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The North Carolina Sedimentation Control Commission

The Sedimentation Control Commission (SCC) was created to administer the Sedimentation Control Program pursuant to the NC Sedimentation Pollution ControlAct of 1973 (SPCA). It is charged with adopting rules, setting standards, and providing guidance for implementation of the Act. The composition of the Commission is set by statute to encompass a broad range of perspectives and expertise in areas related to construction, industry, government, and natural resource conservation and quality. All members are appointed by the Governor and serve three-year terms, except for the Director of the Water Resources Research Institute of The University of North Carolina, who serves as long as he remains Director. The chairman of the SCC is named by the Governor. The following is a list of current members with the organizations they represent:

Chairman:

Kyle Sonnenberg
Fayetteville
NC League of Municipalities

Vice Chairman:

Donnie W. Brewer
Greenville
NC Environmental Management Commission

Commissioners:

W. T. "Buzz" Bryson
Raleigh
NC Public Utilities

Elaine C. Chiosso
Bynum
Non-governmental Conservation

John William Miller, Jr.
Burnsville
NC Mining Commission

Joseph H. Kleiss
Raleigh
NC State University, Dept. of Soil Science

Grover McPherson
Winston-Salem
NC Soil and Water Conservation Commission

David H. Moreau
Raleigh
Water Resources Research Institute of The University of North Carolina

Joseph Rudek
Raleigh
Non-governmental Conservation

Mark A. Taylor
Greensboro
Professional Engineers of NC

Richard Vick
Wilson
Carolinas Associated General Contractors

F. Roger Watson
Asheville
NC Home Builders Association

Effects of Design Changes on Sediment Retention Basin Efficiency

By Melanie S. Markusic
Soil Science Department
North Carolina State University

Sediment pollution from construction sites has been of increasing concern since the impacts on nearby streams can be severe. Controlling erosion is the most effective approach to reducing sediment loads, but construction sites typically have large areas of exposed soil during the active phase of clearing and grading. As a result, sediment traps and basins are required to capture eroded sediment on most of these sites. The purpose of this research was to determine the trapping efficiencies of sediment basins of various designs installed on active construction sites. Five traps and one basin were monitored in the Piedmont of North Carolina, all on highway construction sites except one trap on a private development. Automatic samplers were installed to measure flow and to obtain representative samples during storm events. The basins were surveyed after storms to determine the change in volume after repeated surveys. Trapping efficiency was calculated from the sediment accumulation within the traps or basin and the amount of sediment discharged, the sum of which was the total sediment entering the device. Particle size distribution in the sediment deposits was also determined.

Two standard traps with rock outlets were found to have 37% and 46% trapping efficiencies. A standard trap with silt fence baffles was found to have 45% and 36% efficiency rates during two time periods. Two additional traps, one which had been sized for a 25-year storm event instead of the standard 10-year event, and one with a 1m standing pool had retention efficiencies of 96% and 99%, respectively. A sediment basin with porous baffles and a skimmer outlet had a retention efficiency of 99.8%. Two standard traps had particle size distributions for sand, silt, and clay of 34%, 36%, and 30% and 55%, 25%, 20% while a standard trap with a permanent pool had particle size distributions of 55%, 20%, and 25%. The standard trap with silt fence baffles had a distribution of 36%, 50%, and 14%. The 25-year trap had distributions of 75%, 18%, and 7% and the skimmer basin had a distribution of 62%, 28%, and 10%. The higher proportion of sand in the more efficient devices suggests that the less efficient traps are releasing significant amount of sand-size sediment. Larger basins and surface outlets clearly provide greater sediment trapping on construction sites.

	Trapping Efficiencies	Particle Size Distribution		
		Sand	Silt	Clay
Standard 10-year Trap	37%	55%	25%	20%
Standard 10-year Trap	46%	34%	36%	30%
Standard 10-year Trap with Silt Fence Baffles	45% (first 3 months) and 36% (last 5 months)	36%	50%	14%
Standard 10-year Trap with 1m Standing Pool	99%	55%	20%	25%
Standard 25-year Trap	96%	75%	18%	7%
Skimmer Basin	99.8%	62%	28%	10%

Stormwater Scoops

By Chrystal Bartlett
Stormwater Awareness &
Outreach Coordinator
NCDENR Office of Public Affairs

Note: Chrystal has taken a new position with NC Cooperative Extension as of 2/12/07.

Did you know?

- One acre can lose one ton of soil in one night's rain where BMPs have not been maintained.

NPDES Stormwater Construction Permits

- An updated NPDES Stormwater Construction Permit is now available at http://h2o.enr.state.nc.us/su/documents/NCG01-Reissue-2006_2008.pdf
- This replaces any outdated permits received earlier with erosion and sediment control plan approvals. The conditions of the permit are the same as the previous permit.

University Viewpoint:
Level Spreader Design Revisited

By Jon Hathaway and Bill Hunt, PhD
Biological and Agricultural Engineering Department
North Carolina State University

SINCE 1998, NORTH CAROLINA has implemented rules to protect riparian buffers in several major river basins. These rules require that concentrated stormwater runoff be diffused, or spread, prior to discharge into a riparian area. To accomplish this, the Division of Water Quality (DWQ) in the N.C. Department of Environment and Natural Resources (NCDENR) recommended the use of level spreaders (Figure 1) and developed initial design standards in October 2001.

The Biological and Agricultural Engineering Department at North Carolina State University received a grant from NCDENR in December 2005 to evaluate level spreaders as stormwater best management practices (BMPs). The researchers visited 24 locations where level spreaders were in use and performed various qualitative and quantitative analyses.

The results of the study indicated that none of the level spreader–riparian buffer systems was able to provide diffuse flow through the riparian buffer from the level spreader to the stream. Common causes for failure to maintain diffuse flow included the following: lack of maintenance, poor design, riparian topography, poor construction, and human interference. This field evaluation indicated that level spreader systems in North Carolina would benefit from design revisions, construction guidance, and maintenance. The following recommendations were made in the effort to enhance level spreader function:

1. Level spreader lip material – A concrete or sturdy metal lip should be used in all level spreader designs. The lip should be tied into the soil with an appropriately sized concrete footer or similar footer.

2. Level spreader lip dimensions - The concrete lip should extend 3 to 6 inches above the existing grade on the buffer side. Just after the lip, a 3-foot wide, 3- to 4-inch thick layer of No. 57 stone should be used to minimize erosion due to the water spilling over the level lip. This gravel should be laid on top of filter fabric that has been tied into the soil.

3. Buffer slope - Riparian buffer slopes should not exceed 8% when discharging into a densely vegetated buffer and 6% when discharging into a forested buffer. A series of level spreaders may be approved by DWQ for buffer slopes up to 12 to 15%.

4. Flow bypass - Only the amount of flow associated with a rainfall intensity of 1 inch/hour should be routed through the level spreader. All additional flow should be routed to the stream via a properly designed and maintained swale or pipe. Stream banks should be protected at the point where the additional flow will be discharged.

5. Forebay - A forebay, or some form of pretreatment, should be a part of any level spreader design. The forebay surface area should be no less than 0.2% of the contributing catchment's impervious surface area.

As a result, the design guidelines developed by NCDENR in October 2001 were revisited and revised in the summer of 2006. Figure 2 shows a schematic of a level spreader design which follows the revised NCDENR guidelines.

Level spreader design is not as technically challenging as other stormwater BMP designs. Nevertheless, siting and installing a level spreader that functions properly is challenging. The design criteria described in this article represent elements of good level spreader design but do not ensure overall system effectiveness. The internal topography of the riparian buffer must be conducive to keeping flow diffuse. Before designing a level spreader system, the designer should visit the site. This site visit is highly recommended. If conditions are not suitable for the installation of the level spreader (for example, if the slope is too steep or adequate space is not available), other stormwater BMPs should be used. A paper on the level spreader study has been accepted by the Journal of Irrigation and Drainage Engineering and is expected to be published in either 2007 or 2008.

Figure 1: Example of Level Spreader

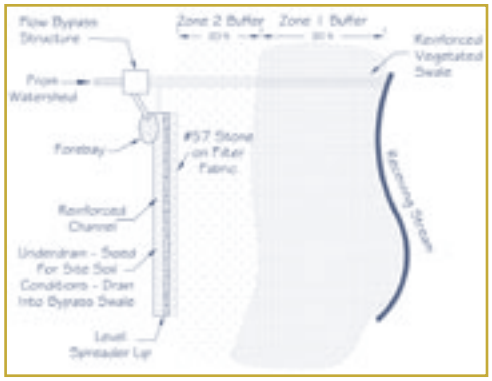

Figure 2: Level Spreader Schematic

Level Spreader Design Guidelines

http://h2o.enr.state.nc.us/su/documents/LevelSpreaderGuidance_Final_-3.pdf

Personnel Changes

- Laura Herbert is a new Assistant Regional Engineer in the Asheville Regional Office.
- Timothy Garrett, Environmental Specialist, has transferred from the Winston-Salem Regional Office to the Mooresville Regional Office.
- Matt Poling is a new Assistant Regional Engineer in the Winston-Salem Regional Office.
- Sally McKinney is a new Assistant Regional Engineer in the Fayetteville Regional Office.
- Paul Worthington is a new Environmental Specialist in the Fayetteville Regional Office.
- Gary Beecher is a new Environmental Specialist in the Wilmington Regional Office.
- Melissa Baker is the new Environmental Specialist in the Fayetteville Regional Office.
- Kristin Hicklin, formerly Assistant Mining Specialist with the Raleigh Central Office, is an Assistant Regional Engineer in the Asheville Regional Office.
- Charlie Whaley, Environmental Specialist, has transferred from the Mooresville Regional Office to the Winston-Salem Regional Office.

Updates to the NC DENR Land Quality Section Website

VERY SOON, YOU WILL be seeing a new and improved Land Quality Section website at http://dlr.enr.state.nc.us/pages/landqualitysection.html.

We have been hard at work trying to make our site more user-friendly and filled with even more valuable information regarding erosion and sedimentation control.

A few changes include:

- Frequently asked questions (FAQs): Some of the answers to our most commonly received questions will be answered, including, "Where can I purchase an Erosion & Sediment Control Planning and Design Manual?".
- Easier navigation: An effort has been made to allow for easier navigation through the site. Within just a few clicks, you should be able to locate all information on the site. A site map will also be a handy tool to reach any location on our site more quickly.
- More downloadable documents: One thing you may notice about the new website is that there are more PDF documents available for easier download. Some of these PDFs, including the Planning and Design Manual, will even be fully searchable. The ability to search the Planning and Design Manual for a specific topic is just one of the major benefits of our new site.

These changes to the website are just one more step in improving the processes of education and permitting in erosion and sediment control across the state. We will continue to work to make our website a better resource for you and would appreciate any feedback you may have on how we can do so. Please contact Jeff.Reid@ncmail.net with any comments or suggestions you may have.

Due to the website updates, you can now find the NC Erosion and Sediment Control Planning and Design Manual at: http://dlr.enr.state.nc.us/pages/publications.html

For more information on Sediment and Erosion Control, please visit:

NC Dept. of Environment and Natural Resources - Land Quality Section
www.dlr.enr.state.nc.us/pages/landqualitysection.html

International Erosion Control Association
www.ieca.org

Experiencing EC07 Reno

Annual Conference of the International Erosion Control Association February 12–16, 2007

Melanie Markusic, Soil Science Department, North Carolina State University

Sunday, February 11th

I arrived at the Atlantis Casino and Resort Hotel around 3:00pm Pacific time. Walked over to the Reno-Sparks Convention Center around 4:30 to get registered and find out any last minute information. The IECA staff was wonderful and full of helpful tips. I was given two books for the two days of classes that I had signed up for. I can get an early start on reading the information tonight..

Monday, February 12th

Early to rise as my body assumes it is still on east coast time. 4:30am seems a little unreasonable though. Classroom adventures began at 8:30, so I wanted to make sure I had a good head start. Headed out for an all day class entitled "Low Impact Development: Saving Soil by Design." This class was designed for developers, planners, water resource managers, and all other erosion control professionals who strive to prevent erosion and protect receiving waters in addition to holding it back on an active construction site. This was a great class taught by two individuals from Minnesota.

A Monday evening gathering of first-time attendees began sharply at 5:00pm with an introduction about the board members and people we should know. It was an hour-long reception with plenty of opportunity to get to know fellow erosion control specialists. A nice addition to an overwhelming day. I mingled with people from the Southeast Chapter (as well as other regions).

Tuesday, February 13th

Up bright and early AGAIN and ready for yet another fun-filled day of education. My class was called "The Best of BMPs: Application, Implementation, and Maintenance." This session was taught by John McCullah, professor at Shasta College in Redding, CA. He is also the man behind Dirt Time TV. With a nice lunch break today we were able to enjoy the Awards Luncheon where different chapters were recognized for their outstanding accomplishments over the year.

Tuesday evening was the official opening of the Expo Hall. A great opportunity to mingle with people in the industry and enjoy an amazing meal. There were close to 200 vendors available to talk to and exchange information. The Ghost of Mark Twain made an appearance along with live musical accompaniment.

Wednesday, February 14th

Valentines Day! Ah, what a day to be away from your loved ones…..but none the less away and learning. Starting off the day with the General Session at 8:00am. Christine Ervin, past president and CEO of the US Green Building Council and the author of Certified Green, was the keynote speaker. Great presentation and full of wonderful information about "keeping up with the Jones'" in the world of green building. You can find more information on Christine Ervin and this topic at http://www.christineervin.com/. The general session topics were quite diverse, including NC State University's Dr. Richard McLaughlin on "Polyacrylamide Reduces Erosion on Construction Site Slopes" and NCDOT's Ted Sherrod highlighting the 25th anniversary of CPESC (Certified Professional in Erosion and Sediment Control).

Thursday, February 15th

I attended a session entitled "Dry-Land Erosion Control Using Photosynthetic Microorganisms," taught by Dr. Timothy Flynn of Colorado. Dr. Flynn is studying the effect of crust forming microbes on erosion in arid regions. Later, I attended a session taught by the Southeast Chapter's very own Johnny Grace, PhD (who also won the award for Best Technical Paper) on "Modeling Erosion from Forest Roads with WEPP.

Friday, February 16th

I didn't get to attend the field trip down the Truckee River for exploration of erosion over the years, but it sounded like a great post-conference event.

I would say that the conference overall was a success! There were over 2600 attendees this year, which made it the biggest IECA conference thus far.

New Certification Program Launched at EC07 Reno

CPESC, Inc. has launched a new program, *Certified Erosion, Sediment, and Storm Water Inspector Certification Program* (CESSWI). Read more about this program in the next issue of *Sediments* or visit **www.cpesc.org**

SEDIMENTS
Newsletter of the North Carolina
Sedimentation Control Commission
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Permit No. 2353

Calendar of Events

4/3/07	Level III: Design of Erosion and Sediment Control/Stormwater Pollution Prevention Plan – Part A (Designed for private engineering firms, NCDOT engineers, and advanced level technicians, who design E&SC plans for NCDOT projects.) Raleigh, NC www.bae.ncsu.edu/workshops/dot/level3overview.html
4/4/07	Level III: Design of Erosion and Sediment Control/Stormwater Pollution Prevention Plan – Part B (Designed for contractors, resident engineers and assistant engineers, who design or approve the E&SC plans specifically for reclamation sites on NCDOT projects. Also, designed for NCDOT operations personnel, who design the E&SC component of reclamation plans.) Raleigh, NC www.bae.ncsu.edu/workshops/dot/level3overview.html
4/17-18/07	Erosion and Sedimentation Control Planning and Design Workshop Boone, NC www2.ncsu.edu:8010/ncsu/CIL/WRRI/erosionseminars.html.
4/25/07	Level II: Erosion & Sediment Control/Stormwater Site Management Raleigh, NC www.bae.ncsu.edu/workshops/dot/leveliioverview.html
5/2/07	Level III: Design of Erosion and Sediment Control/Stormwater Pollution Prevention Plan – Part A Raleigh, NC www.bae.ncsu.edu/workshops/dot/level3overview.html
5/3/07	Level III: Design of Erosion and Sediment Control/Stormwater Pollution Prevention Plan – Part B Raleigh, NC www.bae.ncsu.edu/workshops/dot/level3overview.html
5/15/07	Sediment and Erosion Control Workshop Raleigh, NC www.soil.ncsu.edu/swetc/sediment2/2007/main2.htm